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Chronic Pain in Neurodivergent Individuals: A Hidden Epidemic

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ABSTRACT

Chronic pain often goes unrecognized in neurodivergent patients. The issue especially affects populations with ASD (autism spectrum disorder) and ADHD (attention-deficit/hyperactivity disorder). Underdiagnosis probably stems from differences in the presentation of pain symptoms. Patients in these groups experience pain more frequently, for more extended periods, and with greater intensity than their neurotypical peers. For instance, what looks like irritability or withdrawal may in reality be suffering. Starting from childhood, neurodivergent individuals report more frequent pain episodes, and it continues throughout adolescence and adulthood, where multisite and axial pain becomes more common. This phenomenon likely arises from a combination of factors, including sensory hypersensitivity, neuroinflammation, and a general imbalance in the way the nervous system processes stimuli. Diagnostic overshadowing can also play an important role. Clinicians may mistakenly attribute physical symptoms to the main characteristics of autism or attention-deficit/hyperactivity disorder. The cost of missing these cases can be high. Unmanaged pain afflicts daily functioning, can worsen mental health, and deepen healthcare inequalities. There is some evidence suggesting that treating ADHD may help reduce chronic pain symptoms; however, this area remains underexplored. To resolve this problem, we need greater clinician awareness, improved pain assessment tools tailored to neurodivergent populations, and more personalized treatment strategies.

Keywords: Chronic pain, Autism spectrum disorder, ADHD, Neurodivergent, Diagnostic overshadowing.

1. INTRODUCTION

Pain (especially chronic) is widely underrecognized in neurodivergent individuals, particularly those with ADHD and ASD. Children diagnosed with ASD report chronic pain at approximately twice the rate compared to neurotypical peers (15.6% vs. 8.2%; OR ≈ 2.19) (Kasahara et al., 2025; Udal et al., 2024; Whitney & Shapiro, 2019). In adults, ADHD strongly increases the risk of developing multiple noncancer pain conditions. This higher risk does not stop with single conditions. Musculoskeletal pain, frequent headaches, and fibromyalgia come up again and again in studies, and the numbers show a 40–70% greater chance of being diagnosed when compared with control groups (Chruciel et al., 2023).

The reasons for this are not entirely clear, but several explanations have been suggested. Researchers have mentioned central sensitization, disrupted dopamine pathways (often discussed in the context of ADHD), ongoing neuroinflammation, and, in some cases, increased axial muscle tone, which intensifies the experience of pain (Kasahara et al., 2025; Kerekes et al., 2021). Another challenge is diagnostic overshadowing. Here the pain gets explained away as part of the neurodevelopmental traits instead of being recognized as a separate medical issue. This kind of thinking slows down recognition, creates delays in treatment, and often breaks care into smaller, unconnected pieces (Chruciel et al., 2023; Kasahara et al., 2025; Xie et al., 2025).

The target of this review is to synthesize the most current evidence on mechanisms, prevalence, diagnostic challenges, and emerging management strategies for chronic pain in ASD and ADHD, highlighting the need for neurodiversity-informed pain assessment and care.

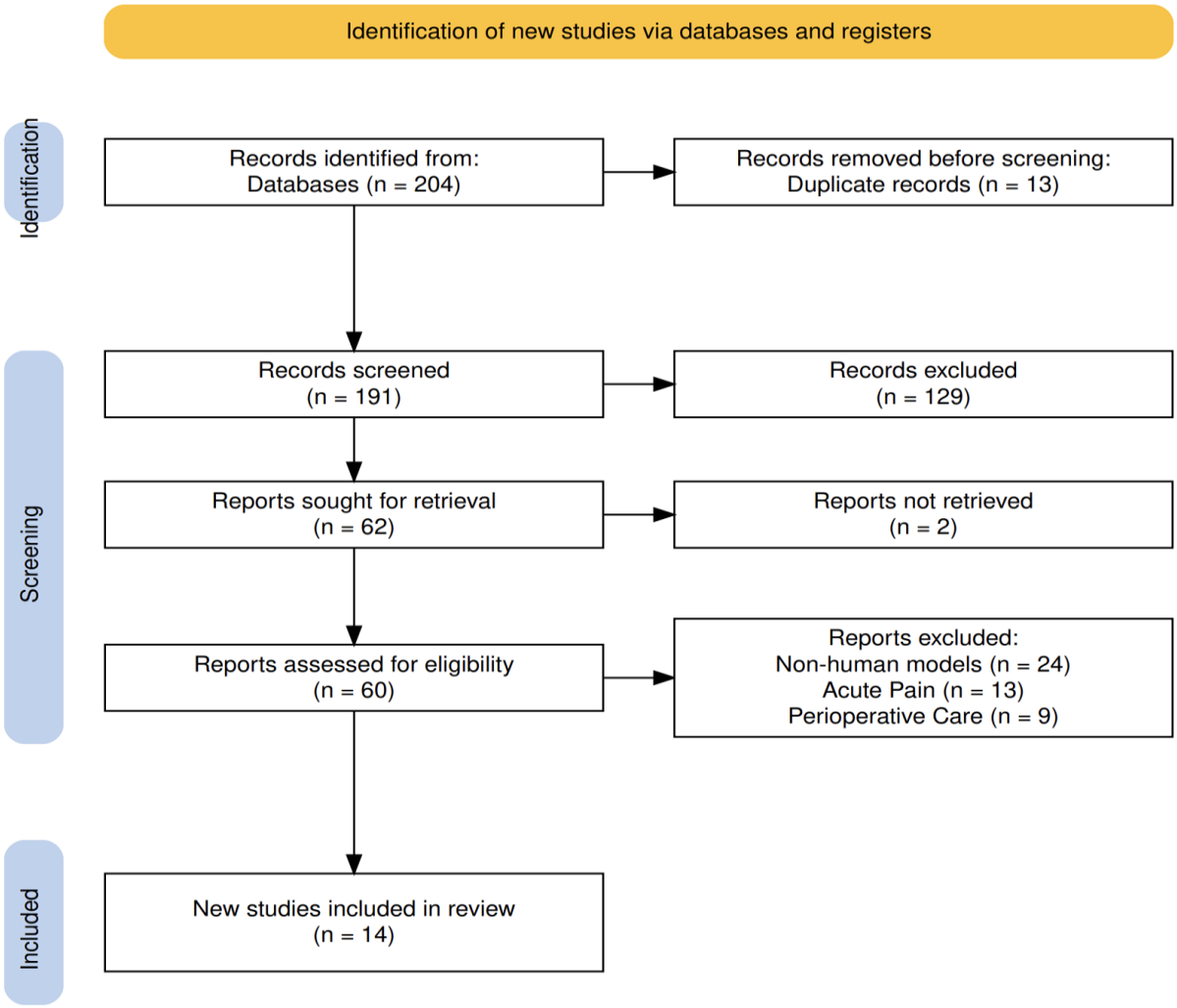

Figure 1. PRISMA flowchart

2. REVIEW METHODS

This review article focuses on recent scientific literature describing chronic pain in neurodivergent populations, specifically individuals with ADHD and ASD. We carried out searches in the following databases: Web of Science, Scopus, PubMed, and the Cochrane Library, and included studies published up to June 2025. We searched for the following phrases: chronic pain, ADHD, autism spectrum disorder, ASD, diagnostic overshadowing, pain in neurodivergent, and ADHD and ASD medication and pain. In building this review, we looked at a wide range of studies. These included original research articles (both observational and interventional), systematic reviews, and also large registry analyses that focused on the prevalence, mechanisms, or management of chronic pain in people with ASD or ADHD. We kept our focus on peer-reviewed work published in English, while leaving out reports that dealt only with non-

human models, acute pain, or pain related to surgery and the perioperative setting. The choice of what to include was guided step by step by methodological quality, how directly the study answered the research question, and whether the findings could be applied in clinical settings. We gave extra weight to studies with larger samples, clearly defined outcomes for chronic pain, and validated diagnostic tools (which add strength to the conclusions). The entire selection process is outlined in the PRISMA flow diagram (Figure 1).

3. RESULTS & DISCUSSION

Epidemiology and Prevalence

Children with ASD most often report headaches and back pain. Around 15.6% experience these symptoms (compared with 8.2% of neurotypical peers), and in many cases, the pain continues as they grow (Jones & Shivamurthy, 2022; Xie et al., 2025). Reports coming from pediatric pain clinics point to even higher numbers. Almost 30% of the children who arrive at these clinics with chronic pain show autistic traits, and more than half complain of pain in more than one body area. Many also face added struggles with sensory processing and everyday communication (Han et al., 2024). A similar pattern shows up in adults with ADHD. In fact, as many as 80% report chronic axial or widespread pain. In one clinical sample, close to three-quarters of patients were found to meet criteria for ADHD. What stands out here is that the severity of pain often goes together with problems in muscular regulation (sometimes described as poor muscle control), which may point to a neuromuscular factor tied to ADHD symptoms (Han et al., 2024; Udal et al., 2024).

Mechanisms: Shared Neurobiological Pathways

There's growing recognition that chronic pain in people with autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD) isn't just coincidental—it seems to come from shared neurological pathways that mess with how pain is processed. Sensory sensitivity plays an important role in both ASD and ADHD. In children and adults with ASD, even a light touch or small physical discomfort can trigger strong reactions (likely because of unusual connections between the thalamus and sensory brain regions). These atypical neural connections may affect how sensory information is processed, which can make everyday sensations overwhelming (Han et al., 2024). ADHD involves a related but distinct mechanism. Disruptions in dopamine signaling can interfere with the brain's natural pain-regulation pathways (making painful sensations feel stronger or more complex to ignore). Many individuals with ADHD also experience muscle tension and poor posture (which can further amplify back or neck pain) (Udal et al., 2024). Chronic, low-level inflammation also contributes. Even mild, persistent inflammation and specific immune mediators (such as cytokines) seem to maintain ongoing discomfort in both populations (Xie et al., 2025). Altogether, these findings underscore that pain in these groups has a clear biological basis (suggesting that interventions should address both neural and musculoskeletal mechanisms).

Diagnostic barriers

Even though chronic pain is common in neurodivergent people, it often goes unnoticed or gets dismissed. One primary reason for this is a medical term called diagnostic overshadowing—clinicians assume that mental disorders in the previously described groups cause the pain, instead of recognizing it as a separate medical issue. So instead of investigating further, the problem is underestimated (Xie et al., 2025).

Another vital challenge involves the lack of validated pain assessment tools that are sensitive to neurodiversity (and able to capture differences in communication or cognitive processing). Most existing instruments rely on verbal self-report or caregiver proxies (which can underestimate or misrepresent the severity of pain in autistic individuals or in those with executive dysfunction) (Han et al., 2024). A recent systematic review noted that very few studies in this field actually used direct self-report measures (even among cognitively able adults) (Garriga-Cazorla et al., 2025). Delays in diagnosing and treating chronic pain occur frequently (often reducing quality of life and increasing the likelihood that pain becomes long-lasting). A problem comes from the split between mental and physical health care. This gap can cause evaluations to be incomplete and care to feel patchy (which makes it harder for patients). People already getting mental health support often have clinicians focus on behavior or psychological issues. Physical symptoms can get missed (and this can lead to underdiagnosis).

Overcoming these problems will require better education for clinicians, more seamless integration of care across medical specialties, and the creation of pain assessment tools specifically adjusted for neurodivergent individuals.

Impact on quality of life

Quality of life declines noticeably in individuals with ASD and ADHD. This reduction affects daily life and also hits emotional well-being, independence, and social participation (which can make coping with chronic pain even harder). Pain worsens sensory overload and interferes with communication in individuals with ASD, which can lead to greater dependence or social withdrawal. In people with ADHD, chronic pain can disrupt sleep. It often makes concentrating more difficult and can lower performance at school, during academic tasks, or at work (all of which can worsen the main symptoms of the disorder) (Han et al., 2024). Pain that occurs alongside neurodevelopmental challenges can reduce coping skills, increase emotional instability, and sometimes lead to avoiding healthcare (which may, in turn, increase social isolation and worsen long-term outcomes). These findings show why integrated; patient-centered care is essential. Such care needs to address pain as well as cognitive, emotional, and functional challenges (all of which are closely connected).

Treatment Approaches and Emerging Interventions

For individuals with ASD or ADHD, chronic pain is challenging to manage. Sensory sensitivities, executive functioning difficulties, and emotional strain (all of which complicate daily life) often interact with atypical pain processing, making even mild sensations feel intense. These combined factors make identifying and treating pain more difficult than in neurotypical individuals. Therefore, clinicians need to adjust treatment to each case. Medication can address part of the problem, but unusual responses and a lack of strong evidence hinder the achievement of results. Interestingly, recent studies suggest that methylphenidate (a medication used to treat ADHD) may alter how individuals perceive pain. A 2023 review indicated that stimulants, including methylphenidate, may help reduce central sensitization (though additional evidence is still required) (Kasahara et al., 2025).

A study looking at children with ADHD found that those who received the stimulant mentioned earlier had higher pain thresholds than peers who did not take the drug. This result points to the possibility that stimulants may help reduce sensitivity to pain (Bozkurt & Balta, 2023). There is also a long-term case report of an adult with idiopathic pain whose symptoms fully resolved after years of OROS-methylphenidate treatment (without any reported side effects). In this instance, the patient took the medication for seven years (Asztély et al., 2019). There is non-medication therapies called CBT (cognitive-behavioral therapy) and MBSR (mindfulness-based stress reduction). To be effective, therapists should adapt them to each individual's sensory and communication preferences. There is growing evidence that both approaches can have positive effects. In a small 2023 study, autistic adults who took part in a tailored mindfulness program reported lower anxiety and better ways to cope with their pain (showing how mindfulness can support daily functioning) (Forbes & Miller, 2023).

Digital interventions are also making care more accessible. For example, a recent group-based online program called Personal Danger Signals Reprocessing (PDSR) led to notable reductions in pain interference, anxiety, and depression in people with nociplastic pain (offering a scalable approach that could be especially helpful for individuals with ADHD-related executive difficulties) (Gat et al., 2025).

Even though these approaches (both pharmacological and non-pharmacological) show real potential, access to truly integrated, neurodiversity-informed pain care remains limited — and in many places, it's still the exception rather than the rule. Multidisciplinary setups that bring together medication, psychological support, and physical rehabilitation are rarely part of standard care, even though all three are often needed together (not separately). What's more, neurodivergent individuals — especially those with autism or ADHD — are still vastly underrepresented in chronic pain research, which continues to hold back the development of solid, evidence-based guidelines. There's a growing recognition of this gap, and with it, a louder call for inclusive research practices — ones that actively involve autistic and ADHD individuals not just as subjects, but as participants in designing and testing treatments, so that care becomes more relevant, more effective, and more equitable (Boerner et al., 2025; Garriga-Cazorla et al., 2025). In summary, Table 1 presents all the interventions described.

Table 1. Treatment Approaches and Emerging Interventions for Chronic Pain in Individuals with ASD and ADHD

Intervention	Description
Stimulant medications (e.g., methylphenidate)	reduce central sensitization and raise pain thresholds in individuals with ADHD.
A long-term case study of OROS-methylphenidate	showed complete remission of chronic pain in an adult with ADHD.
Adapted CBT and MBSR	support coping, lower distress, and improve pain-related functioning

	in neurodivergent adults.
Digital program (PDSR)	group-based online therapy for managing pain, anxiety, and depression in nociplastic pain patients.
Multidisciplinary, neurodiversity-informed care	integrates pharmacological, psychological, and physical interventions for neurodivergent individuals.

ADHD: Attention-Deficit/Hyperactivity Disorder; ASD: Autism Spectrum Disorder; CBT: Cognitive Behavioral Therapy; MBSR: Mindfulness-Based Stress Reduction; PDSR: Personal Danger Signals Reprocessing

4. CONCLUSION

To summarize, chronic pain, which is widespread among patients with ADHD and ASD, is not sufficiently recognized or diagnosed. Its persistence results from factors such as sensory hypersensitivity, neuroinflammation, and difficulties in dopamine regulation. As a result of these factors, patients' symptoms can become chronic. Diagnostic overshadowing and the lack of appropriate assessment tools tailored for neurodivergent individuals are other problems that delay receiving help. Stimulant medications like methylphenidate may help modulate pain in some cases, but aren't a universal solution for all patients. Approaches not involving drugs, such as CBT and mindfulness-based interventions, can be promising but require adaptation to meet individual needs. Unfortunately, integrated care combining medical, psychological, and rehabilitative approaches is still uncommon. Many fields require changes. Starting from research (especially inclusive), clinician training, and adjustments to tools. Moving forward, a multidisciplinary and patient-focused approach is urgently needed. It holds the potential to improve both symptom management and the well-being of ADHD and ASD patients.

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Not applicable.

Ethical approval

Not applicable.

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Conflict of interest

The authors declare that there is no conflict of interest.

Data and materials availability

All data associated with this study will be available based on a reasonable request to the corresponding author.

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